

## TIES442 - Assignment project - Phase 3

Deadlines for handing in the results of this phase, and their effects on the awarded points:

- max 2 points: 14 April 2015 10:15 am
- max 1 point: 30 June 2015 12:00 pm

Group:

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### Assignments for this phase:

**These may be updated until 7 April 2015 10:00 am**

In the previous phase, we tried to analyze the changes in the state of the environment via reflex-like actions of the agent. In this phase, we shall add more detail to our analysis of state changes and prepare to add some planning to the agent's behavior using searches.

- Add more detail to your sketch of the environment state and the elements that comprise it. Enumerate all elements that make up the state of the environment. If these elements have some attributes, meaning that they do not just exist but they can also change somehow as the state of the environment evolves, describe these attributes. If there are more than 20 individual elements, you can take some subset of the environment, but try to retain a reasonable and unified whole.
  - Categorize the elements in the environment according to whether the agent can affect them or not. The idea is to divide the environment in two parts: that which changes due to agent's actions, and that which changes independent of the agent. It would be good, if the part that depends on the agent's actions contained at least 10 elements. Notice that some elements may belong to both parts, meaning the agent may change something that may change also on its own or due to actions of other agents.
  - Start sketching the changes in the state of the environment as a tree. Each node of the tree represents a state, and each child node represents a new state that arises due to some action taken by the agent. If there are very many actions, you can restrict the number to 3-5 per state. If there are many changes in the environment that do not depend on the agent, for example an opponent in the game, you can choose the opponent's actions arbitrarily at this phase. Describe at least four levels of the resulting tree, meaning at least three consecutive actions taken by the agent. Is it possible that the same state may occur multiple times in the tree, or do the state changes form a graph with loops?
  - Select one goal state for the agent, that it should reach from its initial state, and describe it. Consider different searching strategies in the state tree for finding a chain of actions that would take the agent to its goal state. Here as well you can select the changes that happen independent of the agent arbitrarily. Would breadth-first search, depth-first search or some of their variants be the best option? Why?
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